CLAIMS

1. An integrated circuit, comprising:

an array of state-change devices and including a first decoder circuit and a second decoder circuit for selecting a particular state-change device;

a voltage source coupled to the first decoder circuit;

sense circuitry coupled to the second decoder receiving an electrical parameter from the selected state-change device and detecting a particular value of the electrical parameter; and

a control circuit coupled to the voltage source, the first and second decoders, and the sense circuitry for selecting a first voltage from the voltage source to alter the selected state-change device and for selecting a second voltage from the voltage source when the sense circuitry detects the particular value of the electrical parameter.

2. The integrated circuit of claim 1, wherein the control circuit includes logic for selecting the first voltage for a predetermined time and then selecting a third voltage before the sense circuitry detects the particular value of the electrical parameter.

3. The integrated circuit of claim 2 wherein the third voltage is equal to the second voltage.

4. The integrated circuit of claim 2, wherein the control circuit includes logic for repeatedly selecting the first voltage for a predetermined time and then selecting the third voltage until the sense circuitry detects the particular value of the electrical parameter.

5. The integrated circuit of claim 1, wherein the control circuit creates a digital pulse train to alternately select between applying the first voltage and a third voltage to the state-change device until the sense circuitry detects the particular value of the electrical parameter.

6. The integrated circuit of claim 5, wherein the sense circuitry compares the received electrical parameter to the particular value during the time the third voltage is applied to the state-change device.

7. The integrated circuit of claim 1 wherein the state-change device is selected from the group consisting of direct tunneling antifuses, silicide switches, and Lecomber switches.

8. The integrated circuit of claim 1 wherein the state-change device comprises read-writeable phase-change material.

9. The integrated circuit of claim 1 wherein the sense circuitry comprises an analog to digital converter for converting the detected electrical parameter to a digital value.

10. The integrated circuit of claim 1 wherein the sense circuitry comprises a digital to analog converter for converting the particular value to an analog signal that is compared to the received electrical parameter.

11. An integrated circuit, comprising:

a state-change device in a first state and having an input, an output, and at least three possible states;

a voltage source coupled to the input of the state-change device;

a sense circuit coupled to the output of the state-change device for detecting when the state-change device enters a predetermined state of the three possible states; and

control circuitry for selecting a first voltage of the voltage source to alter the state-change device and for selecting a second voltage of the voltage source when the sense circuit detects the predetermined state.

12. The integrated circuit of claim 11, further comprising:

a pulse circuit creating a digital pulse train in the control circuitry for alternatively selecting between the first voltage and a third voltage of the voltage source; and

wherein the sense circuit detects a change of state of the state-change device during the time the third voltage is applied.

13. The integrated circuit of claim 12 wherein the third voltage is equal to the second voltage.

14. The integrated circuit of claim 12, wherein the control circuit includes logic for repeatedly selecting the first voltage for a predetermined time and then selecting the third voltage until the sense circuitry detects the particular value of the electrical parameter.

15. The integrated circuit of claim 11, wherein the control circuit creates a digital pulse train to alternately select between applying the first voltage and a third voltage to the state-change device until the sense circuitry detects the particular value of the electrical parameter.

16. The integrated circuit of claim 15, wherein the sense circuitry compares the received electrical parameter to the particular value during the time the third voltage is applied to the state-change device.

17. The integrated circuit of claim 11 wherein the state-change device is selected from the group consisting of direct tunneling antifuses, silicide switches, and Lecomber switches.

18. The integrated circuit of claim 11 wherein the state-change device comprises read-writeable phase-change material.

19. The integrated circuit of claim 11 wherein the sense circuitry comprises an analog to digital converter for converting the detected electrical parameter to a digital value.

20. The integrated circuit of claim 11 wherein the sense circuitry comprises a digital to analog converter for converting the particular value to an analog signal that is compared to the received electrical parameter.

21. A device having memory array, comprising:

a state change device;

means for applying a first voltage to the state-change device;

means for detecting an electrical parameter of the state-change device;

means for comparing the detected electrical parameter to a particular value; and

means for applying a second voltage to the state-change device when the detected electrical parameter compares with the particular value.

22. The device of claim 21 wherein the mean for applying a first voltage is performed in discrete time frames by alternately providing the first voltage and a third voltage.

23. The device of claim 22 wherein the third voltage is equal to the second voltage.

24. The device of claim 22, wherein the means for applying a first voltage includes means for repeatedly selecting the first voltage for a predetermined time and then selecting the third voltage until the means for detecting detects the particular value of the electrical parameter.

25. The device of claim 21 wherein the state-change device is selected from the group consisting of direct tunneling antifuses, silicide switches, and Lecomber switches.

26. The device of claim 21 wherein the state-change device comprises read-writeable phase-change material.

27. The device of claim 21 wherein the means for detecting comprises an analog to digital means for converting the detected electrical parameter to a digital value.

28. The device of claim 21 wherein the means for comparing comprises a digital to analog means for converting the particular value to an analog signal that is compared to a received electrical parameter.

29. The device of claim 21, wherein the means for applying a first voltage creates a digital pulse train to alternately select between applying the first voltage and a third voltage to the state-change device until the sense circuitry detects the particular value of the electrical parameter.

30. The device of claim 29, wherein the means for comparing compares a received electrical parameter to the particular value during time the third voltage is applied to the state-change device.

31. A method of programming a memory array, comprising the steps of:
selecting a state-change element from an array of state-change elements;
applying a first voltage to the selected state-change element;
detecting an electrical parameter of the selected state-change element;
comparing the detected electrical parameter to a predetermined value; and
applying a second voltage to the selected state-change element when the detected electrical parameter compares to the predetermined value.

32. The method of claim 31 further comprising the step of verifying that the state-change device has been programmed to a proper state.

33. The method of claim 31, wherein the step of applying a first voltage further comprises applying the first voltage for a discrete time period and further comprising the steps of:

applying a third voltage to the selected state-change element after the discrete time period before detecting the electrical parameter through the selected state-change element; and

if the detected electrical parameter does not compare to the predetermined value, repeating the steps of applying a first voltage, applying a third voltage, detecting the electrical parameter, and comparing the detected electrical parameter.